Information and definitions of programs for students admitted in fall 2004 or later

Faculty
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Mission statement
Cooper Union’s Department of Mechanical Engineering will produce broadly- and rigorously-educated graduates, able to practice professionally, pursue advanced studies and innovate in a wide range of fields. Together with our faculty and staff, our students will develop a commitment toward lifelong interdisciplinary learning, fulfill their potential for responsible leadership and inspire others to continuously pursue excellence by example.

Program Objectives
• To provide a broad and rigorous basis in the sciences, mathematics, the humanities and social sciences to serve as a foundation for professional and lifelong continuing education in Mechanical Engineering.
• To provide a broad-based analytical and design experience in the fundamental areas of mechanical engineering to enable students to take on advanced research and development tasks.
• To provide students with a wide range of opportunities for strongly interdisciplinary open ended activities to enable students to undertake leadership positions in various fields.
• To provide students with an academic environment of commitment to excellence and pedagogical innovation that contributes to developing leadership, professionalism and lifelong learning for students’ professional careers.

Program description
Mechanical engineering is concerned with the devices and phenomena related to the generation, transmission, application and control of power. Mechanical engineering grew up with the industrial revolution and is today the broadest of the engineering disciplines, encompassing many activities and fields of interest. Mechanical engineers may be involved with research and development, design, manufacturing, sales, application and service, administration, management, as well as teaching and consulting. Their fields of interest include solid mechanics, materials, fluid mechanics, acoustics, heat transfer and thermodynamics, combustion, control systems, manufacturing, CAD/CAM and robotics, or combinations of these as is often the case in the design and development work of complex projects. (Examples: the space shuttle, the investigation of alternate energy from renewable resources, the development of completely automated factories through robotics and human joint replacements.) At The Albert Nerken School of Engineering, the mechanical engineering faculty and students have been, and continue to be, involved in these and other exciting new developments through their project work, research work or consulting.

Mechanical engineering is an ideal foundation for careers in the aerospace industry, ocean engineering, marine engineering, biomedical engineering, the automobile industry, the power and utility industries, and virtually any area of activity that requires analytical abilities combined with a strong background in design practice.

The sequences of courses shown in the undergraduate curriculum table emphasize the fundamental engineering sciences as well as their applications in a computer environment and professional design practice. By the selection of electives and of their design and research projects, students have a large degree of flexibility in exploring their own interests.

Graduate Program
Major areas of concentration are in computer-aided design and engineering, robotics, acoustics, combustion, aerodynamics, mechanics of materials systems, and other inter-disciplinary areas of engineering.
# Mechanical Engineering Program

## Freshman Year

### Fall Semester:
- ESC000.1 Professional Development Seminar 0
- Ma 110 Introduction to Linear Algebra 2
- Ma 111 Calculus I 4
- Ch 110 General Chemistry 3
- EID 101 Engineering Design and Problem Solving 3
- CS 102 Introduction to Computer Science 3
- HSS 1 Literary Forms and Expressions 3

Total Credits Fall Semester 18

### Spring Semester:
- ESC000.2 Professional Development Seminar 0
- Ma 113 Calculus II 4
- Ph 112 Physics I: Mechanics 4
- EID 103 Principles of Design 3
- or
- EID 110 Engineering Design Graphics
- Ch 111 General Chemistry Laboratory 1.5
- Ch 160 Physical Principles of Chemistry 3
- HSS 2 Texts and Contexts: Old Worlds and New 3

Total Credits Spring Semester 18.5

## Sophomore Year

### Fall Semester:
- ESC000.3 Professional Development Seminar 0
- Ma 223 Vector Calculus 2
- Ma 224 Probability 2
- Ph 213 Physics II: Electromagnetic Phenomena 4
- Ph 291 Introductory Physics Laboratory 1.5
- ESC 100 Engineering Mechanics 3
- ESC 110 Materials Science 3
- HSS 3 The Making of Modern Society 3

Total Credits Fall Semester 18.5

### Spring Semester:
- ESC000.4 Professional Development Seminar 0
- EE 120 Principles of Electrical Engineering 2
- Ma 240 Ordinary and Partial Differential Equations 3
- Ph 214 Physics III: Optics and Modern Physics 3
- ESC 101 Mechanics of Materials 3
- ESC 161 Systems Engineering 3
- ME 155 Design and Prototyping 2
- HSS 4 The Modern Context: Figures and Topics 3

Total Credits Spring Semester 19

## Junior Year

### Fall Semester:
- ESC 130 Engineering Thermodynamics 3
- ESC 140 Fluid Dynamics 3
- ME 100 Stress and Applied Elasticity 3
- ME 151 Feedback Control Systems 3
- Engineering or Science Elective 3
- Humanities/Social Sciences Elective 3

Total Credits Fall Semester 18

### Spring Semester:
- ME 101 Mechanical Vibrations 3
- ME 130 Advanced Thermodynamics 3
- ME 142 Heat Transfer 3
- ME 160 Engineering Experimentation 3
- Engineering or Science Elective 3
- Humanities/Social Sciences Elective 3

Total Credits Spring Semester 17

## Senior Year

### Fall Semester:
- ME 120 Design Elements 3
- or
- ME 141 Fundamentals of Aerodynamics 3
- ME 163 Mechanical Engineering Projects 3
- ME 312 Manufacturing Engineering 3
- Free Electives 4

Total Credits Fall Semester 13

### Spring Semester:
- ME 164 Capstone Senior Mechanical Engineering Design 3
- or
- ME 320 Mechanical Design 3
- ME 300 Space Dynamics 3
- Free Electives 6

Total Credits Spring Semester 12

Total credits required for degree 135